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1978 OATS SURVEY REPORT

by

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A mail survey was conducted in 1977 of farmers who were thought to be oats producers, using names obtained from several lists. The purpose of the 1977 mail survey was to obtain answers to the following questions: (1) What kind of farmer grows oats, (2) Where does he grow them, (3) Why does he grow them, (4) How does he produce them? Answers to these questions should enable the breeding program and the Extension Program at the University of Minnesota to better address the problems of oat production and thus maintain, or hopefully improve, the relative competitive ability of oats as a crop in Minnesota. Four groups of Minnesota oat growers were surveyed: (1) Certified Seed Growers who received an allotment of our new variety Lyon, (2) all participants in the 1976 Quaker contract programs, (3) members of the Southeast Farm Management Association who grew oats in 1976, and (4) members of the Southwest Farm Management Association who grew oats in 1976. Approximately 1200 survey questionnaires were mailed to the names on the lists, and 309 useable responses were returned.

A second mail survey was conducted in 1978. The reasons for repeating the survey were: (1) to identify those parameters in oat production that are variable from year to year and those that are more or less constant from year to year; (2) to increase our coverage of important oats producing areas within Minnesota; and (3) to improve our survey methodology, including questionnaire design and data processing.

Questionnaires were mailed to the same four groups of Minnesota oat growers who were surveyed in 1977, using updated mail lists. A fifth group was added. Letters were sent to Vocational Agricultural Instructors who were currently teaching adult farm business management courses in schools in those counties where we felt that out 1977 coverage was not sufficient. The letter asked for cooperation of the instructor. Those instructors who responded that they would like to cooperate were sent packets of questionnaires. Some administered the questionnaires during a class session and others gave the questionnaires to class members who were oat producers for them to return to us individually. This fifth group of oat producers will be identified in the tables in this report simply as "Vo Ag."

Table 1a shows the distribution of farms and fields in the 1978 oats survey mail list. About 1300 questionnaires were sent out and 285 were returned, of which 217 were useable. Some of the questions dealt with the whole farm and some dealt with individual fields, so that the 217 farm responses included useable information on 323 fields.

Table 1b shows a distribution of farms in the 1978 oat survey, compared with that of Minnesota farms reporting oats by cropping district in the 1974 farm census. Our survey had proportionately more respondents

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Table 1a. Distribution of farms and fields in 1978 oat survey by mail list.

Mail List	Number of farms		Number of fields	
	Number	Percent of Total	Number	Percent of Total
1. Certified Seed Grower	42	19	74	23
2. Quaker Contract	51	24	72	22
3. S.E. Farm Management	24	11	27	8
4. S.W. Farm Management	34	16	43	13
5. Vo Ag farmers	66	30	107	33
Total	217	100	323	100

in the Central and the Southwest districts than the 1974 distribution of oat farmers, and proportionately less in most of the other districts. There were not however, any significantly under represented or over represented districts.

Table 1b. Distribution of farms in 1978 oat survey compared with that of Minnesota farms reporting oats by cropping district in 1974 farm census.

Crop Reporting District	1978 Oat Survey		Minnesota Farms Reporting Oats	
	Number	Percent of Total	Number	Percent of Total
1. North West	16	7.4	5,439	10.1
2. North Central	1	0.5	1,045	1.9
4. West Central	28	12.9	9,014	16.7
5. Central	78	35.9	14,182	26.2
6. East Central	5	2.3	3,582	6.6
7. South West	45	20.7	6,524	12.1
8. South Central	16	7.4	6,437	11.9
9. South East	22	10.1	7,643	14.1
unknown	6	2.8	-	-
Totals	217	100	54,071	99.6

Table 3 shows the proportion of respondents growing each of five major crops. All of the respondents grew oats because that was a condition of their being on the mail lists. Several expected differences among mail lists appear. For example, the Southeast and Southwest Farm

Management Association members produced considerably less small grain and more corn than the other groups. The Southeastern respondents had considerably less soybeans than three of the other four groups of respondents. The Vo Ag respondents had practically no soybeans, which is due primarily to the location of the Vo Ag respondents, being generally north of the major soybean growing areas.

Table 3. Proportion of respondents growing each of five major crops, 1978 oat survey.

Crop	Average	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
	- - - - - percent of respondents growing: - - - - -					
Oats	100	100	100	100	100	100
Wheat	35	62	61	8	18	15
Barley	12	26	16	-	-	12
Corn	87	76	88	100	100	80
Soybeans	53	71	73	46	97	6

Table 4 shows the proportion of respondents with livestock and poultry of various kinds. There are several items of interest in this table, such as the generally large number of respondents with feeder cattle, especially in the Southwest. Almost two-thirds of the respondents in the Southeast had dairy cattle, while in most of the other areas only a few respondents had dairy. Farrow-finish hog enterprises were also reported by nearly two-thirds of the respondents in the Southwest and almost one-half in the Southeast. The fact that the Vo Ag respondents had a much higher proportion of respondents with feeder pigs for sale may reflect either the location, i.e., north of the major feed grain producing areas, or it may reflect a younger group of farmers with relatively more labor and less capital available than the other groups. The livestock enterprises are important to oat production because the grain may be used as feed and the straw as bedding. However, because livestock production is highly regionalized, group averages in the tables should be interpreted with care.

Oat acreage in 1978 compared with 1977 and with expected projections for the next 5 years are given in Table 5. Overall, about one-fourth of the respondents increased their oat acreage in 1978 over 1977, slightly less than one-half kept the same acreage, and a little over one-third actually decreased their acreage. These proportions did not vary much among groups of respondents. Overall, nearly 70 percent of the respondents said that they would keep the same oat acreage during the next five years as they had planted in 1978. About one-fourth reported that they will decrease their acreage over the next five years. These responses suggest a relatively stable oat acreage over the next five years for these groups of oat growers.

Table 4. Proportion of respondents with various kinds of livestock and poultry, 1978 oat survey.

Item	Average	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
	- - - - - percent of respondents having: - - - -					
Feeder cattle	37	33	35	50	65	21
Beef cow/calf	13	12	18	8	15	11
Dairy cattle	40	17	14	67	15	11
Farrow-finish hogs	32	12	26	46	62	30
Bought feeder pigs	8	12	16	4	3	5
Feeder pigs for sale	12	5	10	8	6	23
Other	5	7	4	13	6	0
Total number of respondents a/	319	41	62	48	58	110

a/ Number of livestock enterprises varied from none to several per farm, and so a farm with two separate enterprises would show up twice as a respondent. Thus out of a total of 217 farms, there were 319 livestock enterprises reported.

Table 5. Oat Acreage for 1978 and Projections for the next five years, 1978 oat survey.

Item	Total	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
	- - - - - - percent of growers who: - - - - - -					
In 1978						
Increased acreage	22	34	18	21	12	24
Decreased acreage	35	29	39	38	44	30
Kept same acreage	43	37	43	42	44	45
	- - - - - - percent of growers who will: - - - -					
During next five years						
Increase acreage	8	10	8	8	3	9
Decrease acreage	26	26	35	17	26	21
Keep same acreage	66	64	57	75	71	70

Table 6 shows the use that respondents made of the oats that they grew. A low score indicates a very important use and a high score indicates a use that is relatively unimportant. There was a great deal of difference among the different groups of respondents, with seed being most important to certified growers and sale and contract most important with the Quaker growers. For the other three groups, own feed was most important, closely followed by own straw. Use as forage was more important in the Southwest than for any of the other groups of respondents, reflecting a tendency for oats used as a cover crop to be cut for oatlage early in the season.

Table 6. Use of oats by respondents, 1978 oat survey.

Item	Average	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
	adjusted rating [a/]					
Sale as feed	3.7	7.3	1.7*	11.5	5.4	6.1
Certified seed	3.6	1.4*	6.5	20.4	11.4	42.8
Own feed	1.7*	10.1	2.3	1.5*	1.4*	1.6*
Contract with miller	9.1	-	1.8	-	-	57.0
Straw for sale	15.3	14.4	17.3	25.6	26.0	19.6
Own straw	2.2	7.7	2.4	2.0	2.2	2.3
Forage	20.9	84.0	-	23.0	5.8	57.0
Other	34.5	42.0	52.0	69.0	26.0	42.8

a/ Rating by use, i.e., low number most important use, high number least important. Adjustments made for number of respondents indicating a particular use.

* Indicates most respondents for that use.

Table 7 shows the reasons that the respondents gave for growing oats. Again, a low score or rating indicates a very important reason, and a high score indicates a relatively unimportant reason. The most important reasons were use as a cover crop by the Southeast, Southwest, and Vo Ag groups, and as a useful crop in a crop rotation by the certified and Quaker growers. Use of labor in low labor demand periods was important also for the Quaker, certified and Southwestern growers, but not for the other two groups. Financial returns was the least important reason by far for all groups.

The relative ranking of the importance of several varietal characteristics is given in Table 8. Grain yield was the most important characteristic overall and for every group of respondents. Grain yield also had the largest number of respondents for four of the mail lists with protein content having more respondents on the Quaker list, and lodging resistance having an equal number of respondents on the Southeast list. Test weight was the

Table 7. Reasons for growing oats, given by respondents, 1978 oat survey.

Item	Average	Mail List				
		Cert	Quaker	S.E.	S.W.	Vo Ag
	adjusted rating [a/]					
Cover crop	1.7*	4.7	5.6	1.1*	1.8*	1.5*
Crop rotation	1.7	1.9*	1.4*	3.1	2.4	2.6
Higher profit	21.6	8.8	210.0	120.0	120.0	20.3
More dependable	7.2	5.1	8.2	90.0	24.0	7.5
Lower cash input	8.3	6.4	7.8	45.0	15.4	11.8
Labor distribution	4.1	2.8	2.6	13.6	3.6	24.0

a/ Adjusted rating, low number equals most important, high number equals less important.
* Indicates most respondents for that reason.

other major important characteristic, having about equal importance with lodging resistance, overall and for the certified, Southwest and Vo Ag lists. Lodging resistance was more important for the Southeast group and less important for the Quaker group than test weight.

Table 8. Rating of importance of varietal characteristics by respondents, 1978 oat survey.

Item	Average	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
	adjusted rating [a/]					
Seed color	9.0	7.5	8.4	10.9	11.2	8.9
Forage yield	9.2	11.6	10.0	9.8	7.5	8.2
Protein content	5.0	6.4	3.9*	6.1	5.9	4.6
Lodging resistance	3.6	3.7	4.3	2.1*	3.5	3.8
Grain yield	1.8*	1.9*	1.6	1.9*	1.5*	2.0*
Hull percentage	8.3	9.1	8.4	8.8	8.8	7.5
Straw length	6.0	5.5	6.5	6.6	4.7	5.6
Maturity	6.7	8.1	6.2	7.0	7.0	6.2
Test weight	3.7	3.5	3.2	5.3	3.9	3.7
Disease resistance	8.3	9.0	8.1	7.0	9.7	7.9

a/ Adjusted rating, low number equals most important, high number equals less importance.
* Indicates most respondents for that character.

Table 9 shows the preferences of the respondents for three different options for three varietal characteristics: seed color, height, and maturity. The certified growers preferred a white color seed, but the other four groups felt that seed color was not important. All five groups strongly favored an intermediate height. All five groups also preferred a medium maturity.

Table 9. Rating of three choices for each of three traits by respondents, 1978 oat survey.

Item	Average	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
		adjusted rating [a/]				
Seed color						
White	2.4	1.5*	2.4	6.3	3.7	2.3
Yellow	3.2	3.6	2.9	7.2	4.4	2.3
Not important	1.8*	2.1	1.8*	1.6*	1.6*	1.9*
Height						
Short	4.1	4.0	4.8	4.6	4.5	3.5
Medium	1.3*	1.2*	1.2*	1.4*	1.3*	1.3*
Tall	3.7	4.5	4.6	5.4	2.5	3.2
Maturity						
Early	2.7	3.1	2.4	1.8	3.4	2.7
Medium	1.3*	1.4*	1.5*	1.3*	1.2*	1.3*
Late	4.4	5.2	4.9	6.1	4.3	3.4

a/ Adjusted rating, low number equals most desirable, high number equals less desirable.
* Indicates most respondents rated that item.

Source of seed and the proportion of the respondents who used certified seed in 1978 are given in Table 10. The number reporting that they obtained seed from certified seed growers or from the MCIA (Minnesota Crop Improvement Association) seems unusually high, but the way the question was asked probably increased the number of positive responses, i.e., if a respondent planted five acres or less certified seed to produce his seed for the next year, he would still probably respond that he planted certified seed, even though most of his acreage was planted to non-certified seed. The MCIA and other certified growers were the most important sources for the certified group. Quaker respondents used certified seed growers, elevators, and their own seed in about equal proportion. The other three groups used their own seed

more often than they got seed from other sources. Of the respondents who do not use certified seed every year, about 35 said they used it every two years, 43 every three years, 15 every four years, and 12 used certified seed every five years.

Table 10. Source of seed and percent of respondents using certified seed, 1978 oat survey.

Source	Total	Mail List				
		Cert.	Quaker	S.E.	S.W.	Vo Ag
		number of respondents				
MCIA	34	22	5	2	4	1
Certified seed grower	64	25	16	6	6	11
Elevator	57	6	21	6	7	17
Own	83	13	17	11	14	28
Neighbor	23	-	3	1	4	15
Other	4	1	-	-	1	2
Percent using certified seed:	57	81	71	46	44	41

Frequency of use of certified seed:

Every
- 1 yr. 70 respondents
- 2 yr. 35 respondents
- 3 yr. 43 respondents
- 4 yr. 15 respondents
- 5 yr. 12 respondents
- 9 or more yrs. 2 respondents

Information on variety planted, seeding and harvesting dates, seeding rates, grain and straw yields, herbicides and fertilizer use, and disease incidence and damage, was obtained on each field of oats farmed by the respondents. The 217 respondents reported useable information on 323 fields. The following six tables (11, 12, 13, 14, 15, and 16) report information from the data on fields.

A list of the seven most popular varieties, with percent of all fields reported and average acres per field is shown in Table 11. The use of varieties was rather concentrated with the two most popular varieties accounting for 44 percent of the fields reported. The reader is cautioned that the prevalence of Lyon is much higher in the mail survey than in the population of oat growers in Minnesota because the certified list was selected with the knowledge that every person on that list grew some Lyon in 1978. That is why Lyon is listed separately from the other varieties in several tables. For all of the lists except the Vo Ag group, the three most popular varieties accounted for about one-half of the fields.

Table 11. Seven Most Popular Varieties in 1978 Oat Survey.

Variety	Percent of all Fields Reported	Percent of Total Oats Acres Reported	Average Acres Per Field	Percent of all Fields reported by mail list				
				Cert	Quaker	SE	SW	Vo Ag
	%	%	acres	%	%	%	%	%
Noble	22.9	23.1	34	18.9	37.5	33.3	18.6	15.0
Lodi	9.0	7.8	29	2.7	2.8	0.0	14.0	17.8
Chief	8.0	5.1	21	4.1	11.1	11.1	11.6	6.5
Rodney	4.0	5.7	47	0.0	4.2	0.0	0.0	9.3
Lang	3.7	2.2	20	10.8	1.4	0.0	2.3	1.9
Froker	3.1	2.2	24	0.0	2.8	3.7	4.7	4.7
Lyon	21.4	16.8	26	52.7	16.7	3.7	18.6	8.4
Subtotal	72.1	63.0	29	89.2	76.5	51.8	69.8	63.6
All other varieties	27.9	37.0	31	10.8	23.5	48.2	30.2	36.4
Total-all varieties	100	100	30	100	100	100	100	100

Table 12 shows the rate of herbicide application by type of herbicide. Levels among the mail lists did not vary much from the overall average, and therefore, were not reported. Table 13 shows the proportion of all fields on which herbicides were used. The proportion of fields using herbicides varied a great deal among mail lists, from 88 percent of Certified fields to only 19 percent of Southeastern fields. This probably reflects the common use of oats as a cover crop for alfalfa establishment in the Southeast, and therefore, a reluctance to use herbicides on the alfalfa.

Table 12. Rate of herbicide use by type of material, 1978 oat survey.

Herbicide	No. of fields used on	Percent of all treated fields this material used on	Average amount applied
	No.	%	pints/acre
MCP or MCPA	95	56.9	0.567
2,4-D	32	19.2	0.700
Others *	40	23.9	0.641
Subtotal	167	100	0.614
Did not report herbicide use	156	48.3	
Total	323	100	

* Including Banvel, MCP + Banvel, Banvel - K + 2,4-D.

Table 13 also shows the proportion of fields on which fertilizer was used, cross classified by variety and by mail list. Level of total fertilizer use and amount of each nutrient is also shown in Table 13 for varieties. Level of fertilizer use will be shown in a later table for the individual mail lists. Only 19 percent of the Southeast oat growers used fertilizer, again probably reflecting use of oats as a cover crop, but those who did use fertilizer used a high level.

Table 14 shows the yields of grain and straw by variety and by mail list. Yields of grain over all fields ranged from a low of 52 bushels to a high of 73 bushels per acre, but within mail lists, the range was somewhat greater. However, some of the numbers of observations within mail lists are too small to base strong conclusions on. Overall yields of straw ranged from 1300 lbs to 1821 lbs per acre. Again, numbers reporting were small enough to prevent strong conclusions on the individual mail list data.

Table 13. Percent of fields on which herbicide and fertilizer were used, and rate of fertilizer applied, by N, P_2O_5, and K_2O, by variety, 1978 oat survey.

Variety	Percent of Fields herbicides used on	Percent of fields fertilizer used on						Average amount of fertilizer applied per acre of oats [a/]			
		all fields	Cert	Quaker	S.E.	S.W.	Vo Ag	Total	N	P_2O_5	K_2O
	%	%	%	%	%	%	%	lb.	lb.	lb.	lb.
Noble	59	54	86	52	11	50	56	148	33	34	38
Froker	60	30	0	50	0	0	40	167	67	50	42
Lodi	38	41	100	50	0	33	37	188	38	47	75
Chief	38	54	67	75	33	20	57	183	24	35	53
Rodney	38	38	0	67	0	0	30	161	39	35	43
Lang	83	83	100	100	0	100	0	156	42	34	44
Lyon	77	65	72	58	0	50	67	183	31	44	44
All varieties	52	52	78	60	19	44	41	166	33	38	45
Certified	88	78						177	32	42	44
Quaker	71	60						146	28	35	32
S.E.	19	19						210	25	53	48
S.W.	58	44						155	34	31	22
Vo Ag Farmers	20	41						169	34	35	61
All fields	52	52						166	33	38	45

a/ Total refers to total fertilizer material applied, whereas the remaining three columns refer to pounds of nutrients applied. Thus they do not add up to the total.

Table 14. Yield of grain and of straw, by variety and by mail list, 1978 oat survey.

Variety	Yield of grain in bushels per acre						Yield of straw in pounds per acre					
	All Fields	Cert	Quaker	S.E.	S.W.	Vo Ag	All Fields	Cert	Quaker	S.E.	S.W.	Vo Ag
	- - - - - - - bushels per acre - - - - - - -						- - - - - - - -pounds per acre - - - - - - -					
Noble	65	67	61	71	71	65	1696	2214	1178	2009	1443	1752
Froker	52	-	-	49	40	55	1470	--	--	2450	1500	1133
Lodi	59	35	60	-	62	60	1477	1500	2500	--	1711	1352
Chief	71	70	80	74	64	65	1746	1500	1700	3500	1700	1557
Rodney	56	-	70	-	-	54	1300	--	--	--	--	1300
Lang	69	73	50	-	70	65	1743	1850	--	--	1400	1700
Lyon	73	76	63	62	61	54	1821	2100	1740	2000	1850	1414
Other varieties	61	73	62	52	69	58	1580	1800	1033	2031	1230	1367
All varieties	65	75	64	61	69	59	1647	1981	1415	2121	1667	1436

Table 15 shows the percent of fields on which some disease was reported and the level of yield loss due to disease reported on those fields by variety. Crown rust and stem rust were the most frequently found diseases, being on about one-half of all fields (all varieties.) Red leaf was third in incidence, being on one-fourth of all fields. Frequencies varied considerably among varieties. Nearly two-fifths of all fields also reported some measurable yield loss due to disease. Table 16 presents a slightly different breakdown of disease incidence, classified by percent of fields having various levels of infection of the disease.

Table 17 shows the incidence of underseeding a legume in the oats crop. Almost one-third of the fields reporting underseeded, and the crop underseeded was predominately alfalfa.

Table 18 presents estimates of costs and returns for oat production. Items in the first and third sections of the table were reported directly by farmers. Items in the second section were calculated from information on quantities reported by respondents and standard or typical prices. Gross receipts per acre varied considerably among mail lists, because both yields per acre and average price received varied so much. Material inputs also varied considerably, but machine costs were remarkably similar. The fourth section of Table 18 presents summaries of costs per acre and per bushel, with and without a charge for land. The results are not surprising, i.e., oats is not a very profitable crop. But, as discussed earlier, the respondents felt that there were more important reasons for growing oats than profit.

Table 15. Percent of fields on which some disease was reported and the level of yield loss due to disease reported on those fields by variety, 1978 oat survey.

Variety	Percent of fields having some infection from each of the following:					Percent of fields with yield loss due to disease					
						Total percent reporting loss	Percent reporting loss classified by level of yield loss				
	Crown Rust	Ergot	Red Leaf	Smut	Stem Rust		1-4 bu	5-8 bu	9-12 bu	13-16 bu	17+ bu
	%	%	%	%	%	%	%	%	%	%	%
Noble	61	1	34	20	59	54	17.5	20.0	22.5	20.0	20.0
Froker	40	0	20	40	20	40	75.0	25.0	0	0	0
Lodi	48	0	17	32	34	48	7.1	28.6	28.6	14.3	21.4
Chief	46	12	31	12	50	35	11.1	11.1	22.2	44.4	11.1
Rodney	31	0	15	0	46	31	0	50.0	25.0	0	25.0
Lang	50	0	25	8	58	33	25.0	0	75.0	0	0
Lyon	39	1	26	6	36	30	28.9	19.0	28.6	0	23.8
Other varieties	35	2	20	12	33	30	37.5	25.0	25.0	0	12.5
All varieties	45	1	25	16	45	40	21.2	22.2	26.0	6.7	24.0

Table 16. Level of infection from five common diseases of oats, and loss in yield as a result of disease, 1978 oat survey.

Name of Disease	Percent of Fields having disease levels a/			
	1	2	3	none
	- - - percent of all fields - - -			
Crown Rust	21.4	13.1	9.9	55.4
Ergot	1.2	0.0	0.0	98.5
Red Leaf	11.5	7.7	6.2	74.6
Smut	14.6	0.9	0.9	83.6
Stem Rust	23.8	11.5	9.3	55.4

a/ 1 = low, 2 = moderate, 3 = high level of infection

Loss in yield from disease:

none	60%
some	40%

Average loss from disease 12.1 bushels/acre.
Modal loss from disease 10 bushels/acre.

Table 17. Number and proportion of all oat fields on which alfalfa or other crops were underseeded, 1978 oat survey.

Item	Number Reporting	Percent Reporting
Underseeded:		
No	155	48.0
Yes	100	31.0
Blank	68	21.0
Total	323	100
Crop underseeded:		
Alfalfa	87	87.0
Other	13	13.0
Total	100	100

Table 18. Costs and returns from oats production on 323 oats fields as reported by respondents to 1978 oats survey.

Item	All Fields	Cert	Quaker	SE	SW	Vo Ag
Returns						
1. Yield of grain-bu./acre	65.2	74.6	63.7	61.1	68.5	59.5
2. Price of grain-$/bu.	$ 1.13	$ 1.58	$ 0.97	$ 1.05	$ 1.04	$ 1.03
3. Crop product return-$/acre	$73.68	$117.87	$61.79	$64.16	$71.24	$61.29
4. Yield of straw-lb./acre	1647	1981	1415	2121	1667	1435
5. Price of straw-$/ton	$19.25	$ 21.09	$18.48	$21.33	$19.38	$18.11
6. Gross ret. from straw-$/acre	$15.85	$ 20.89	$13.07	$22.62	$16.15	$12.99
7. Proportion harv. straw-%	52.0	43.0	28.0	70.0	56.0	69.0
8. Avg. ret. from straw-$/acre	$ 8.24	$ 8.98	$ 3.66	$15.83	$ 9.04	$ 8.96
9. Total avg. crop ret.-$/acre	$81.92	$126.85	$65.45	$79.99	$80.28	$70.25
Costs						
Materials						
10. N cost-$/acre	$ 5.76	5.76	5.04	4.50	6.12	6.12
11. P cost-$/acre	6.46	7.14	5.95	9.01	5.27	5.95
12. K cost-$/acre	3.44	3.52	2.56	3.84	1.76	4.88
13. (Subtotal) Fert. cost-$/ac	$15.66	16.42	13.55	17.35	13.15	16.95
14. Fields used on-%	52.0	78.0	60.0	19.0	44.0	41.0
15. Avg. fert. cost-$/acre	$ 8.14	12.81	8.13	3.30	5.79	6.95
16. Herbicide cost-$/acre	$ 1.25	1.25	1.25	1.25	1.25	1.25
17. Fields used on-%	52.0	88.0	71.0	19.0	58.0	20.0
18. Avg. herbicide cost-$/acre	$ 0.65	1.10	0.89	0.24	0.73	0.25
19. Avg. seed cost @ (2.36/bu)-$/ac	6.23	8.19	6.61	5.33	5.89	5.01
20. Subtotal materials cost	$15.02	22.10	15.63	8.87	12.41	12.21
Machinery Cost/acre						
21. Plow	$ 6.72	6.83	5.57	6.00	5.71	8.10
22. Disc	3.37	2.82	2.57	2.33	3.00	4.81
23. Harrow	1.81	1.13	1.83	2.75	1.87	1.87
24. Seeding without fert.	3.06	2.63	3.10	4.11	2.53	3.17
25. Fert. spreader-$2.08/acre	1.08	1.62	1.25	0.40	0.90	0.85
26. Herbicide sprayer-$1.91/acre	0.99	1.68	1.36	0.36	1.11	0.38
27. Swathing	3.71	3.56	3.65	4.27	4.09	3.28
28. Combining	8.72	9.27	8.26	10.29	8.11	8.11
29. Baling straw (7.38/acre)	3.84	3.17	2.07	5.17	4.13	5.09
30. Hauling grain ($0.06/bu.)	3.91	3.73	5.10	2.44	3.43	3.57
31. Subtotal mach. cost	$37.21	36.44	34.76	38.12	34.90	39.14
Cost Summary						
32. Total listed costs-$/acre	$52.23	58.54	50.39	46.99	47.31	51.35
33. Tota l listed costs-$/bu.	0.80	0.78	0.79	0.77	0.69	0.86
34. Land charge-$/acre	53.85	61.74	50.30	62.50	68.35	34.84
35. Lines 32 + 34-$/acre	106.08	120.28	100.69	104.49	115.66	86.19
36. Lines 32 + 34-$/bu.	$ 1.63	1.61	1.58	1.79	1.69	1.45